Block 1: Manipulating expressions
- R - Simplify algebraic expressions
- Use identities
- **Add and subtract simple algebraic fractions**
- **Add and subtract complex algebraic fractions**
- **Multiply and divide simple algebraic fractions**
- **Multiply and divide complex algebraic fractions**
- Form and solve equations and inequalities with fractions
- **Solve equations with algebraic fractions**
- <u>Represent numbers algebraically</u>
- <u>Algebraic arguments and proof</u>
- Expand and factorise with a single bracket
- Expand binomials
- Factorise quadratic expressions
- **Factorise complex quadratic expressions**
- Solve equations equal to 0
- Solve quadratic equations by factorisation
- **Solve complex quadratic expressions by factorisation**
- **Complete the square**
- **Solve quadratic equations using the quadratic formula**

Expression
Coefficient
Identity
Solution set
Reciprocal
Factorise

End of block assessment
Knowledge Organiser

Manipulating expressions block
Lower Attainer Guidance
Higher Attainer Guidance

Block 2: Gradients and lines

By the end of this unit of learning all students will be able to
- Equations of lines parallel to the axis
- Plot straight line graphs
- Interpret $y = mx + c$
- Find the equation of a straight line from a graph (1)
- Find the equation of a straight line from a graph (2)
- Equation of a straight-line graph given one point and gradient
- Equation of a straight-line graph given two points
- Determine whether a point is on a line
- Solve linear simultaneous equations graphically
- **Recognise when straight lines are perpendicular**
- **Find the equations of perpendicular lines**

Block 3: Non-linear graphs

By the end of this unit of learning all students will be able to
- Plot and read from quadratic graphs
- Plot and read from cubic graphs
- Plot and read from reciprocal graphs
- Recognise graph shapes
- Identify and interpret roots and intercepts of quadratics
- **Understand and use exponential graphs**
- **Find and use the equation of a circle centre (0, 0)**
- **Find the equation of the tangent to any curve**

Block 4: Using graphs

By the end of this unit of learning all students will be able to
- Reflect shapes in given lines
- Construct and interpret conversion graphs
- Construct and interpret other real-life straight line graphs
- Interpret distance/time graphs
- Construct distance/time graphs

- Construct and interpret speed/time graphs
- Construct and interpret piece-wise graphs
- Recognise and interpret graphs that illustrate direct and inverse proportion
- Find approximate solutions to equations using graphs
- **Estimate the area under a curve**

This block was not completed in year 10 so needs to be done now

Block 5: Collecting and representing data
- Understanding populations and samples
- **Construct a stratified sample**
- Primary and secondary data
- Construct and interpret frequency tables and frequency polygons
- R - Construct and interpret two-way tables
- Construct and interpret line and bar charts (including composite bar charts)
- R - Construct and interpret pie charts
- Criticise charts and graphs
- **Construct histograms**
- **Interpret histograms**
- R - Find and interpret averages from a list
- R - Find and interpret averages from a table
- **Find and interpret averages from a grouped data table**
- R - Construct and interpret time series graphs
- Construct and interpret stem-and-leaf diagrams
- **Construct and interpret cumulative frequency diagrams**
- **Use cumulative frequency diagrams to find measures**
- **Construct and interpret box plots**
- **Compare distributions using charts and measures**
- **Compare distributions using complex charts and measures**
- R - Construct and interpret scatter graphs
- R - Draw and use a line of best fit
- Understand extrapolation

Population
Sample
Representative
Random sample
Bias
Primary data
Secondary data
Outlier

End of block assessment
Knowledge Organiser

Data block
Lower Attainer Guidance
Higher Attainer Guidance

Block 6: Changing the subject

By the end of this unit of learning all students will be able to

- Solve linear equations
- Solve inequalities
- Form and solve equations and inequalities in the context of shape
- Change the subject of a simple formula
- Change the subject of a known formula
- **Change the subject of a complex formula**
- **Change the subject where the subject appears more than once**
- **Solve equations by iteration**

Block 7: Functions

By the end of this unit of learning all students will be able to
- Use function machines
- Substitute into expressions and formulae
- Use function notation
- **Work with composite functions**
- **Work with inverse functions**
- Graphs of quadratic functions
- **Solve quadratic inequalities**
- Understand and use trigonometric functions

Block 7: Multiplicative reasoning

By the end of this unit of learning all students will be able to
- Use scale factors
- Understand direct proportion
- **Construct complex direct proportion equations**
- Calculate with pressure and density
- Understand inverse proportion
- **Construct inverse proportion equations**
- Ratio problems

Block 8: Geometric reasoning

By the end of this unit of learning all students will be able to
- Angles at points
- Angles in parallel lines and shapes
- Exterior and interior angles of polygons
- Proving geometric facts
- Solve problems involving vectors
- **The first four circle theorems**
- **Angle between a radius and a chord**
- **Angle between a radius and a tangent**
- **Two tangents from a point**
- **Alternate segment theorem**
- Pythagoras' theorem and trigonometrical ratios

Block 9: Algebraic reasoning

By the end of this unit of learning all students will be able to
- Simplify complex expressions
- Find the rule for the nth term of a linear sequence
- **Find the rule for the nth term of a quadratic sequence**
- Use rules for sequences
- Solve linear simultaneous equations graphically
- Solve simultaneous equations with one quadratic graphically
- **Formal algebraic proof**
- **Inequalities in two variables**

Block 10: Algebraic reasoning

By the end of this unit of learning all students will be able to
- Perform and describe line symmetry and reflection
- Perform and describe rotation/rotational symmetry
- Perform and describe translations of shapes
- Perform and describe enlargements of shapes
- **Perform and describe negative enlargements of shapes**
- Identify transformations of shapes
- Perform and describe a series of transformations of shapes
- **Identify invariant points and lines**
- Perform standard constructions using ruler and protractor or ruler and compasses

- Solve loci problems - **Understand and use trigonometrical graphs** - **Sketch and identify translations of the graph of a given function** - **Sketch and identify reflections of the graph of a given function**		
Block 11: Listing and describing		
By the end of this unit of learning all students will be able to - Work with organised lists - **Use the product rule for counting** - Sample spaces and probability - Complete and use Venn diagrams - Construct and interpret plans and elevations - Use data to compare distributions - Interpreting scatter diagrams		
Block 12: Show that….		
By the end of this unit of learning all students will be able to - "Show that" with number - "Show that" with algebra - "Show that" with shape - "Show that" with angles - "Show that" with data - "Show that" with congruent triangles - **Formal proof with congruent triangles**		